

From glowbugs@theporch.com Tue Jan 14 10:49:14 1997  
Return-Path: <glowbugs@theporch.com>  
Received: from uro (localhost.theporch.com [127.0.0.1])  
by uro.theporch.com (8.8.4/AUX-3.1.1)  
with SMTP id KAA05318;  
Tue, 14 Jan 1997 10:41:27 -0600 (CST)  
Date: Tue, 14 Jan 1997 10:41:27 -0600 (CST)  
Message-Id: <199701141641.KAA05318@uro.theporch.com>  
Errors-To: ws4s@infoave.net  
Reply-To: glowbugs@theporch.com  
Originator: glowbugs@theporch.com  
Sender: glowbugs@theporch.com  
Precedence: bulk  
From: glowbugs@theporch.com  
To: Multiple recipients of list <glowbugs@theporch.com>  
Subject: GLOWBUGS digest 414  
X-Listprocessor-Version: 6.0c -- ListProcessor by Anastasios Kotsikonas  
X-Comment: Please send list server requests to listproc@theporch.com  
Status: 0

#### GLOWBUGS Digest 414

Topics covered in this issue include:

- 1) Re: 45 tube  
by John Michael <MICHAEL@ecs.umass.edu>
- 2) Re: Push-Pull Oscillator/Transmitter  
by rdkeys@csemail.cropsci.ncsu.edu
- 3) Re: Images of my homebrew CW TX.  
by "Robert M. Bratcher Jr." <bratcher@worldnet.att.net>
- 4) Re: 45 tube  
by "Robert M. Bratcher Jr." <bratcher@worldnet.att.net>
- 5) Traders Nets???  
by "Brian Carling" <bry@mail1.mnsinc.com>
- 6) Re: Need 3.3957mHz Crystal  
by "Brian Carling" <bry@mail1.mnsinc.com>
- 7) ER article  
by "Brian Carling" <bry@mail1.mnsinc.com>
- 8) SB-101 VFO - what freq?  
by Dave <gekko95@ix.netcom.com>
- 9) Son of Reluctant Regen  
by Art Winterbauer <art@comet.ucar.edu>
- 10) Re: Son of Reluctant Regen  
by "Joseph L. Hartmann, Jr." <joe@h@sugar-river.net>
- 11) Military Surplus  
by "Brian Carling" <bry@mail1.mnsinc.com>
- 12) 6DQ6 -A or -B?  
by jkh@lexis-nexis.com (John Heck)

13) Quote of the Month!  
by "Claton Cadmus" <aplitech@Spacestar.Net>  
14) Re: VFO question  
RE: VFO QUESTION  
by larrys@fmis02.nsc.com (Larry Szendrei, ARS NE1S)

-----  
Date: Mon, 13 Jan 1997 12:38:20 -0500  
From: John Michael <MICHAEL@ecs.umass.edu>  
To: GLOWBUGS@theporch.com  
Subject: Re: 45 tube  
Message-ID: <01IE5XJXI740D6H0D2@ECS.UMASS.EDU>

>I have a friend in need of a number 45 tube. Where can one find one at a  
>reasonable price? Are there any substitutes?

The 45 is a filamentary power triode, used singly and in push-pull in lots of 30's-era home radios like the Philco cathedrals and consoles. For some reason the golden-ears crowd took a fancy to them and have driven the prices out of sight--last I looked, in excess of \$50 for a new one. Don't know of any substitutes that aren't just as scarce.

John Michael            michael@ecs.umass.edu

-----  
Date: Mon, 13 Jan 1997 15:33:52 -0500 (EST)  
From: rdkeys@csemail.cropsci.ncsu.edu  
To: EricNess@aol.com  
Cc: rdkeys@csemail.cropsci.ncsu.edu (), glowbugs@theporch.com  
Subject: Re: Push-Pull Oscillator/Transmitter  
Message-ID: <9701132033.AA119801@csemail.cropsci.ncsu.edu>

>  
> New year greetings to my fellow lovers of fire bottles and radios that glow  
> in the dark.  
>  
> Over the holiday I finally had a chance to work on my next project; a push  
> pull oscillator/transmitter for 40 meters. At this time I feel I am a bit to  
> inexperienced to attempt a TPTG style transmitter and so I have chose a  
> design that uses a crystal for the grid circuit. I built up a push pull  
> crystal oscillator circuit using two 6C5s and it seems to oscillate quite  
> nicely near the crystal frequency. Before I try to put this this beast on  
> the air, I have a few questions I would like to ask the group:

Hey, sounds like a great lil glowebugge ye gots there, matey!

> 1. What would be the best way to couple a push-pull stage into a low  
> impedance load (50 ohm coax feeding a wire dipole)? I was thinking that I  
> should link couple the push pull tank to a second tuned circuit that is end  
> linked.

Well, there are numerous ways to couple out of it, but the use of a two turn link around the center of the plate coil will be the starting point for most simple ways. Ground the link and wrap 2 turns around the tank, fairly closely coupled. I used old coax and strip the braid off to make a nice high voltage wire for winding links with the plastic as spacer.

Then, almost any simple tuner would work to feed the coax from there.

For a coax feed, it would be entirely appropriate to use a pi-net tuner to feed the coax to the dipole. Make sure the input and output caps are at or very near maximum capacitance, then adjust the coil for maximum output on a field strength meter with the output capacitor fully meshed and use what coil is required. Then adjust the output capacitor slightly to peak, and then the input capacitor to peak (or if the tuner has an swr bridge [what the heck is swr to a glowebugge, but mostly mythology, anyway] you can use the swr bridge to tune for the swr null). A pair of 365pf broadcast variables with a coil of maybe 40 turns 2-2.5 inches in diameter should do nicely. If you have a piece of miniductor stock of anything close to that size and number of turns, it should work well, since you need to adjust the turns to suit.

Alternatively, you can use merely a series coil and capacitor to feed a low impedance antenna of any sort, hooked up to the link. Try a coil about 2-2.5 inches in diameter with 40 turns of bell wire and a series capacitor to the coax of about 150 pf or so. Merely tune for maximum output on a field strength meter and you are matched. This is what I use for almost all of my rigs. It has worked great, since the spark era.

My expectation is that you should get about 2 watts output from a pair of 6C5's. More than that may be pushing, slightly. If you want more, try a larger triode, maybe, or possibly paired 6N7's or 6SN7's. Then you should be able to get 10 watts output comfortably.

> 2. I have noticed that if the tank is tuned below the frequency of the  
> crystal, oscillation stops. As a result, it is difficult to tell optimum  
> tuning of the tank. When tuning from minimum capacitance, I can see the the  
> plate current go up when the circuit starts oscillating and can see the  
> current start to decrease as the tank approaches the crystal frequency;  
> However, once I pass the crystal frequency, the oscillations stop before the  
> plate current goes up again. Should there be a dip in plate current before  
> the dip or is this simply the way these oscillators work?

On an oscillator you will not see a dip, only on an amplifier. The plate current on the oscillator will increase as the tank nears resonance. As it goes below resonance, it will reach a point where IT controls the circuit and the xtal will stop oscillating and it becomes a TPTG sort of rig. It will then oscillate anywhere the tank happens to tune (bad bad). If the thing does not oscillate as a tptg rig then, it will just sit there and draw enough current to possibly exceed plate dissipation ratings of the tubes. The usual practice is to find the point at where the xtal stops oscillating or pulls badly, and then tune up from that sufficiently to give a stable signal. The sufficient uptuning will usually be only 2-3 divisions on an oscillator dial (relatively critical). As you couple out the oscillator the tuning will be slightly affected, so it may require some slight retuning for most stable signal. It is sort of a two-fisted operation, but once you get the hang of it, it goes smoothly, thereafter.

Your mileage may vary, but that should get you in the ballpark.

You might consult some of the classic practicum on the subject to get a bit more understanding of what to expect. See the following.....

1. Cody, W.G., Proc. I.R.E. April, 1922.22.
2. Pierce, George W., Proc. Am. Acad. Arts Sci., October, 1923.
3. Shaw, H.S., QST, July, 1924.

Also, it was covered fairly well in any of the late 20's and early 30's handbooks, if you can find them in the local library. The first editions of the Radio Handbook seem to cover it pretty well.

> 73,  
> Eric, WD6DGX

Good Luck! Glowebugges ferever!

73/ZUT DE NA4G/Bob UP

-----  
Date: Mon, 13 Jan 1997 12:56:19 -0600  
From: "Robert M. Bratcher Jr." <bratcher@worldnet.att.net>  
To: cfb@bga.com  
Cc: Multiple recipients of list <glowbugs@theporch.com>  
Subject: Re: Images of my homebrew CW TX.  
Message-ID: <3.0.32.19970113125615.006b4108@postoffice.worldnet.att.net>

At 04:30 AM 1/13/97 +0000, Chris Broadbent wrote:

>Hello all,  
>  
>I have finally put together a couple of web pages displaying images of my  
>homebrew 6LR8 based TX, along with what I believe are useful comments on  
>construction and composition of said device. The URL is:  
>  
> <http://www.bga.com/~cfb/>  
>  
>If your web browser does not like this, try dropping the rightmost / (after  
>~cfb). If you still have problems or you don't have a browser, drop me a  
>message and I'll put the images into an ftp site or mail them to you.  
>  
>I look forward to your comments. I am proud of this first tube effort, but  
>please don't be shy to criticise as I have much to learn.  
>  
>I really look forward to meeting anyone from this group on the air using  
>the device (if you're on the 80M novice band at any time - currently 3695  
>and 3710 KHz given my current crystals).  
>  
>--  
>  
>Cheers,  
>  
>Chris F. Broadbent ( KC5VQL )  
>

Looks very nice! Now how bout the schematic? How much power does it put out?

Robert M. Bratcher Jr.

E-mail to:

[bratcher@worldnet.att.net](mailto:bratcher@worldnet.att.net)

Record collector, 8mm, super 8, 16 and 35mm Film collector.

I like old radio's too.

Collins, Hallicrafters, National & Hammurland are my Favorites!

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Date: Mon, 13 Jan 1997 13:14:30 -0600

From: "Robert M. Bratcher Jr." <[bratcher@worldnet.att.net](mailto:bratcher@worldnet.att.net)>

To: [glowbugs@theporch.com](mailto:glowbugs@theporch.com)

Subject: Re: 45 tube

Message-ID: <3.0.32.19970113131426.006e2c54@postoffice.worldnet.att.net>

At 05:45 PM 1/13/97 +0000, you wrote:

>>I have a friend in need of a number 45 tube. Where can one find one at a  
>>reasonable price? Are there any substitutes?

>

>The 45 is a filamentary power triode, used singly and in push-pull in

>lots of 30's-era home radios like the Philco cathedrals and consoles.  
>For some reason the golden-ears crowd took a fancy to them and have  
>driven the prices out of sight--last I looked, in excess of \$50 for a  
>new one. Don't know of any substitutes that aren't just as scarce.  
>  
>John Michael            michael@ecs.umass.edu  
>

A.E.S should have them. My local antique radio club (Houston Vintage Radio Association) is having a 2 day mega auction this Friday & Saturday. If a box of tubes has one or more 45's I'll buy it & pass the 45 tubes along at a fair price. Since these would be used the price would be much cheaper than A.E.S charges. How much, I don't know yet. If I get one or more 45's in a box then I'll post here to the group. If I don't report a "found" 45 by monday then there wasn't one at the club action. That's the best I can do...

Robert M. Bratcher Jr.  
E-mail to:  
bratcher@worldnet.att.net  
Record collector, 8mm, super 8, 16 and 35mm Film collector.  
I like old radio's too.  
Collins, Hallicrafters, National & Hammurland are my Favorites!

-----  
Date: Mon, 13 Jan 1997 14:12:12 +0000  
From: "Brian Carling" <bry@mail1.mnsinc.com>  
To: glowbugs@theporch.com  
Subject: Traders Nets???  
Message-ID: <199701132211.RAA14320@news2.mnsinc.com>

Does any one know about any Traders Nets on HF or VHF?

If you can tell me the UTC TIME and FREQUENCY  
that these nets meet on I would really appreciate it.

I keep a list here for anyone that would like to see what I already  
have:

It's in the ham radio resources area at the URL below.  
Under HAM FILES/ SWAP NETS.

Let me know what you can guys. Thanks

\*\*\*\*\*  
\*\*\* 73 from Radio AF4K / G3XLQ in Gaithersburg, MD USA \*  
\*\* E-mail to: bry@mnsinc.com \*  
\*\*\* See the great ham radio resources at: \*  
\*\* http://www.mnsinc.com/bry/ \*

\*\*\*\*\*

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Date: Mon, 13 Jan 1997 16:28:32 +0000  
From: "Brian Carling" <bry@mail1.mnsinc.com>  
To: kd6poc@juno.com (Adam J McLaughlin), glowbugs@theporch.com  
Subject: Re: Need 3.3957MHz Crystal  
Message-ID: <199701140028.TAA22682@news2.mnsinc.com>

Adam I have a huge list of XTAL suppliers and sources at:  
<http://www.mnsinc.com/bry/>  
in the ham radio resources section

Enjoy! AF4K, Bry

On 11 Jan 97 at 15:58, Adam J McLaughlin chatted merrily:

> Hello Fellow Glowbuggers!  
>  
> I need a rock for 3.3957 MHz as fast as I can get it. Does anyone  
> know of any sources where I can get this rock? I need it for a  
> heterodyne rig.  
>  
> Thanks in Advance,  
>  
> Adam McLaughlin KD6POC  
> KD6POC@juno.com  
> kd6poc@kd6kwm.#nocal.ca.usa.noam  
>

\*\*\*\*\*  
\*\*\* 73 from Radio AF4K / G3XLQ in Gaithersburg, MD USA \*  
\*\* E-mail to: bry@mnsinc.com \*  
\*\*\* See the great ham radio resources at: \*  
\*\* <http://www.mnsinc.com/bry/> \*  
\*\*\*\*\*

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Date: Mon, 13 Jan 1997 17:15:49 +0000  
From: "Brian Carling" <bry@mail1.mnsinc.com>  
To: glowbugs@theporch.com  
Subject: ER article  
Message-ID: <199701140115.UAA25229@news2.mnsinc.com>

Anyone see the nice little "Cakepan 6AQ5" XMTR design in the December  
issue of Electric Radio?

I think it look spretty nifty, even theough the kit seemed like it was a little steeply priced! But heck WHERE are you going to find any OTHER Glowbug kits these days? There just aren't many!

\*\*\*\*\*  
\*\*\* 73 from Radio AF4K / G3XLQ in Gaithersburg, MD USA \*  
\*\* E-mail to: bry@mnsinc.com \*  
\*\*\* See the great ham radio resources at: \*  
\*\* <http://www.mnsinc.com/bry/> \*  
\*\*\*\*\*

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Date: Mon, 13 Jan 1997 19:10:38 -0800  
From: Dave <gekko95@ix.netcom.com>  
To: glowbugs@theporch.com  
Subject: SB-101 VFO - what freq?  
Message-ID: <199701140310.TAA02156@dfw-ix6.ix.netcom.com>

Hi gang,

I have just acquired, through the generosity of Jon Mitchel (possibly a member of the group) a 'fried' SB-101. The PT0 seems ok, though.

I was wondering - can I use this in a standalone mode? What frequency does it cover? If it covers the standard 5 - 5.5 MHZ, it would make a perfect VFO for a 30 meter mono-bander (one of my plans). Or maybe I could alter the frequency range. Does anyone have a schematic?

Any info regarding this VFO unit would be very much appreciated. I don't feel guilty about gutting a dead SB-101 instead of my old ARC-5 receivers I wrote about last week!!

I'd like to find a glowbug home for this in one of my ongoing projects.

Thanks,

Dave WB7AWK

"I want to die peacefully in my sleep, like my Grandfather. Not screaming and in terror like his passengers"



-----  
Date: Mon, 13 Jan 1997 21:42:19 -0700 (MST)  
From: Art Winterbauer <art@comet.ucar.edu>  
To: glowbugs <glowbugs@theporch.com>  
Subject: Son of Reluctant Regen  
Message-ID: <Pine.SUN.3.95.970113213416.19288A-100000@spike>

Well, after spending a good 30 hours or so playing with tickler/grid coils, the beastie still won't regenerate. So, I'll be a bit more specific about the circuit.

'Tis the one described in the Feb 1990 CQ, p. 74, by the venerable Ingram. I'd like to get this two-tuber going, and I wonder if anyone else has gotten this particular circuit to work. To repeat, I can copy my old Jackson R.F. signal generator on the specified frequencies, using the windings described and reproduced exactly. But no regen. I've taken the tickler coils from 60% down to 1% (well, one turn) with varying degrees of spacing between the two sets of coils. I've used all different kinds of wire, from #30 to #20 enameled wire.

Is the circuit pictured just so off-the-wall that the chances of it working are very slim?

Most of my homebrew circuits don't work. But I thought I'd stand a chance with this one...it has so few parts!

--Art WA50ES

-----  
Date: Tue, 14 Jan 1997 03:11:09 -0500 (EST)  
From: "Joseph L. Hartmann, Jr." <joe@h@sugar-river.net>  
To: Art Winterbauer <art@comet.ucar.edu>  
Subject: Re: Son of Reluctant Regen  
Message-ID: <Pine.BSD/.3.91.970114030212.2891G-100000@arakis.sugar-river.net>

Heck -- at 2:26 AM do you expect to get any sense out of me? Art, in 1952 I tried to build the one-tuber in the handbook. I never got it to work. What a bummer. Now that a lot of water has gone down the sewer pipe:

1. Is it an "amplifier". If you have a GDO you should verify that the tuned circuits are tuning! Once you have that established. Use the GDO as a signal generator -- figure out some way to measure the output -- you won't have a tone till you regenerate -- but don't even worry about regenerating at first. Read the manual on the GDO -- there should be

some way you can measure the Q of the tuned circuit. Even if it's only approximate. If it doesn't have a fairly high Q I don't think you will ever get it to regen, or even to amplify. Once you can get some kind of measurement going so you you can say "Yes it is receiving the GDO signal", then you can experiment with the regen. You need Positive feedback to get the regen effect -- and if you have positive regen, you will get a progressively more sensitive receiver as you increase the regen. You have to be able to measure the approximate gain so you can see if your amplifier is actually getting positive feedback from your regen circuit. A hf scope and sig gen would probably be the best approach, but I think you could use a GDO. If you have a sig gen and scope, by all means use them. The key is measurement: you must know when you are getting a higher gain Rcvr by doing your regen tricks. Maybe something is backwards and you are inducing negative feedback around the amp. Coil winding orientation problems. Things like that. You are making me re-live my own regen frustration now from the vantage point of spending a lot of time learning different things. Don't give up. But MEASURE! It's the only sure way you are going to get that thing to work.

Good luck.

Best Regards,

Joe Hartmann            Tel: (603) 863 6073  
K2AJV -issued           email: joeh@sugar-river.net  
1951                    home-page: <http://www.sugar-river.net/~joeh>

-----  
First Student at the:

Linux Academy in the Sunshine Town of Newport, NH

Thanks to RMS, Linus, and other contributors of free software!

----- I grant this to the public domain -----

On Mon, 13 Jan 1997, Art Winterbauer wrote:

>  
> Well, after spending a good 30 hours or so playing with tickler/grid  
> coils, the beastie still won't regenerate. So, I'll be a bit more  
> specific about the circuit.  
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> no regen. I've taken the tickler coils from 60% down to 1% (well, one  
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> working are very slim?  
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> Most of my homebrew circuits don't work. But I thought I'd stand a  
> chance with this one...it has so few parts!  
>  
> --Art WA50ES  
>  
>

-----  
Date: Tue, 14 Jan 1997 03:46:24 +0000  
From: "Brian Carling" <bry@mail1.mnsinc.com>  
To: glowbugs@theporch.com  
Subject: Military Surplus  
Message-ID: <199701141146.GAA26876@news2.mnsinc.com>

There used to be a GREAT listing and description of MANY models of  
military surplus equipment available on the web at:

<http://linux.cec.army.mil/hamradio/equipment/mi.html>

It no longer works! Does anyone have any idea where it has been moved  
to or has it just disappeared?

ANY help would be appreciated!

Thanks! Bry, AF4K

\*\*\*\*\*  
\*\*\* 73 from Radio AF4K / G3XLQ in Gaithersburg, MD USA \*  
\*\* E-mail to: bry@mnsinc.com \*  
\*\*\* See the great ham radio resources at: \*  
\*\* <http://www.mnsinc.com/bry/> \*  
\*\*\*\*\*

-----  
Date: Tue, 14 Jan 97 08:37:54 EST  
From: jkh@lexis-nexis.com (John Heck)  
To: glowbugs@theporch.com  
Subject: 6DQ6 -A or -B?  
Message-ID: <9701141337.AA24887@beans.lexis-nexis.com>

Folks,  
Can anyone tell me what is the difference between a 6DQ6-A and a 6DQ6-B?  
Especially with respect to its use as a class C amplifier?  
Thanks,  
Regards,  
John Heck, KC8ETS  
1009 Donson Drive  
Dayton, Ohio 45429  
(513)865-7036(work)  
jkh@lexis-nexis.com

-----  
Date: Tue, 14 Jan 1997 07:38:48 -0600  
From: "Claton Cadmus" <aplitech@Spacestar.Net>  
To: "Multiple recipients of list" <glowbugs@theporch.com>  
Subject: Quote of the Month!  
Message-ID: <199701141418.IAA06389@Spacestar.Net>

My apologies to Art but this has got to be the quote of the month!

"Most of my homebrew circuits don't work. But I thought I'd stand a chance with this one...it has so few parts!" --Art WA50ES

73 de KA0GKC Claton Cadmus  
Ph. (612)926-8886 Fax (612)926-8545  
E-mail cla@spacestar.net  
TCP/IP ka0gkc@ka0gkc.ampr.org  
Packet ka0gkc@wb0gdb.#stp.mn.us  
ARRL, QRP-ARCI, NorCal, ARCC, MNQRP Society

-----  
Date: Tue, 14 Jan 1997 09:22:33 -0500  
From: larrys@fmis02.nsc.com (Larry Szendrei, ARS NE1S)  
To: mack@mails.imed.com, glowbugs@theporch.com  
Subject: Re: VFO question  
RE: VFO QUESTION  
Message-ID: <97011409223356@fmis02.nsc.com>

Greetings, Ray...

On 01/10/97 to wrote to GLOWBUGS:

>The easiest way to get the first doubling is to feed the  
>output of the oscillator through a full wave center tap transformer  
>with 2 signal diodes. This is a very efficient doubler. Just put in  
>a switch to select the doubled or straight through signals. All bands

>above 160M will require at least one 2X so that is an easy way to get  
>it. This would allow the second 5763 to be 1X, 2X, or 3X depending on  
>the band selected. The diodes will give a fairly constant load to the  
>oscillator as well. As an even better solution, change the diodes to  
>a 6AL5. This will allow a higher grid signal voltage to the second  
>5763.

My situation is thus:

I have a Knight VFO (model # unknown) which uses a 6AU6 (or 6BA6?) 160M (Colpitts?) osc. and a 6AK5 doubler to 80M. Although the dial is calibrated for 80M, 40M, 20M, 15M, and 10M, there is good and bad news. The good news is that despite the lack of calibration and doubling stage there is still enough output on the fundamental (160M) to use this VFO on 160M with my otherwise homegrown 3-stage 160M-10M low power AM/CW transmitter. The bad news is that this transmitter wants to see an input from the VFO on 40M for the 15M and 10M bands. The plate tank of the doubler stage in the VFO is a slug-tuned coil, which resonates on 80M with the parallel circuit capacitances (coax to transmitter, transmitter grid circuit, etc.). I tried winding another inductance to resonate on 40M but this requires the multiplier stage in the VFO to quadruple, which doesn't provide sufficient drive for the subsequent multiplier stage in the homebrew XMTR. I get similar results by taking the 80M output and attempting to quadruple to 20M (for ultimate 10M operation after doubling in the driver) in the subsequent multiplier stage --> insufficient grid drive to the final.

Your posting has perhaps provided a solution. Please tell me if there are any caveats to the following proposal. Lets say I center-tap the 80M tank coil in the plate circuit of the doubler in the VFO, and hook this to the plate supply (instead of one end going to the plate supply as presently configured). The ends of the coil would then hook to the 2 signal diodes in the "full wave" connection to provide doubling to 40M. The 80M output would be at either end of the tank coil, and the 40M output would be at the junction of the diodes cathodes (or anodes - since we don't care if the DC bias at this point is (+) or (-)). Of course the output at this point would be blocked for DC with a cap., as it is for the 80M output already. On one hand it would seem that this should work, on the other hand I feel like I'm breaking a basic law that says "you don't get something for nothing." I realize that this approach might reduce my output on 160M and 80M, but I seem to have surplus drive on these bands. What I am trying to avoid like the plague is building an additional (active) multiplier stage in order to make the transmitter function with the VFO for 15M and 10M operation.

Or do you have any other ideas to propose??

Thanks,  
Larry, NE1S  
larrys@fmis02.nsc.com

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End of GLOWBUGS Digest 414

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